[Proc. Roy. Soc. Victoria 30 (N.S.), Part I., 1917.]

Art. I.—*Timber Production and Growth Curves in the Mountain Ash (Eucalyptus regnans).*

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(With Plates I.–II.)

[Read April 12th, 1917].

It has been said that Mountain Ash will mature in 40 years, and will give in this time a butt of from 2 ft. to 2 ft. 6 in. It has also been claimed for Mountain Ash that it is the fastest growing tree in the world, and that it will give a cut of 150,000 ft. super per acre. In order to test the truth of these statements a series of measurements was carried out at Powelltown on logs of this timber.

It was found impossible at the time to get any reliable figures as to either its fast growing rate or its quantity of timber per acre. Many factors militated against this. In the first place all the forest now being cut is over ripe, and consequently many trees are hollow. Again, a very large number of trees have incipient decay in the heart. Other factors also prevented any accurate estimate being formed. However, there was ample material for a study of the annual rings. It was impossible to obtain measurements from all logs coming in, as in quite a large percentage there was either a pipe, or decay had proceeded far enough to destroy the boundaries of the first annual rings. Only those logs, then, were taken in which the annual rings were clearly defined. The measurements were taken to the eightieth (80th) ring, and not continued further owing to the difficulty in many cases of distinguishing the rings. In one case the rings, though narrow, were easily distinguishable to the 125th ring. It was obvious from these later rings that the tree had lacked vigour. This was borne out by a study of the trees in the standing forest. The paucity of foliage on these big trees is very noticeable, as was also the amount of mistletoe. No mistletoe was observed on the saplings or even on trees half grown. From these observations, one was led to conclude that the tree reaches its prime well under a hundred years.

The most remarkable feature is the rapid expansion of the trunk (and hence width of annual ring) during the first ten years of growth. This is shown in Fig. 1. In this graph the average width of ring for each decade is shown. The annual rings were measured in groups of ten and then averaged. This was done in order to

allow for the variation of the successive seasons, conditions of environment, and any accidents. Some very wide fluctuations were obtained, but these were discarded as being obviously not the normal growth of the tree. On reference to Fig. 1 it will be seen that there is a steady decline in the width of the ring. It is very apparent, too, that the width varies much less after the 30th year. This rapid decrease to the 30th year, and then a more gradual decrease after that, may indicate that the tree is entering on its manhood, so to speak. The theoretical curve which has been drawn indicates that it will approach the abscissa very gradually, and this is what we would expect.

The differences between the width of the annual rings as the tree gets older will be less and less. There is a point of interest here, and that is that the enormous decrease in the width of the ring may be due to overcrowding, or putting it in other words, that as the trees grow older and so many are striving for the same light and carbon dioxide, that the crown it not as large as it would be if the forest were controlled. It was very apparent from a study of the mature trees that width of ring is largely dependent on the distance of the trees apart, for in many logs the original centre is well to one side of the mature log. Some trees have limbs on the congested side only 6 to 8 ft. long, while on the free side they are 15 to 20 ft. long. The maintenance of a good head is important from a forestral point of view.

In Fig. 2 the curve is given for the diameter at each decade. The curve is remarkably even, and from it one may deduce the age of a tree very approximately if the diameter (or girth) be known.

It will be seen on inspection that the curve is flattening considerably at the 80th year, and this again indicates that the tree is making very little headway. The curve gives rather a remarkable relation between diameter and years of growth. If we let x = age of the tree and y = diameter in inches, we find that the equation $3\sqrt{x}=y$ is approximately the equation to the curve, and by using this equation we can arrive, approximately, at the age of trees grown in the forest.

The flattening of the curve at the 80th year is in accordance with the narrowness of the rings at these older years. In Fig. 3 is given the amount of wood produced in each decade. It will be noticed that the growth of the second decade is approximately twice that of the first decade. The maximum growth occurs in the fifth decade. To fully establish the year of maximum growth, more measurements will be necessary, though the year may vary according to local

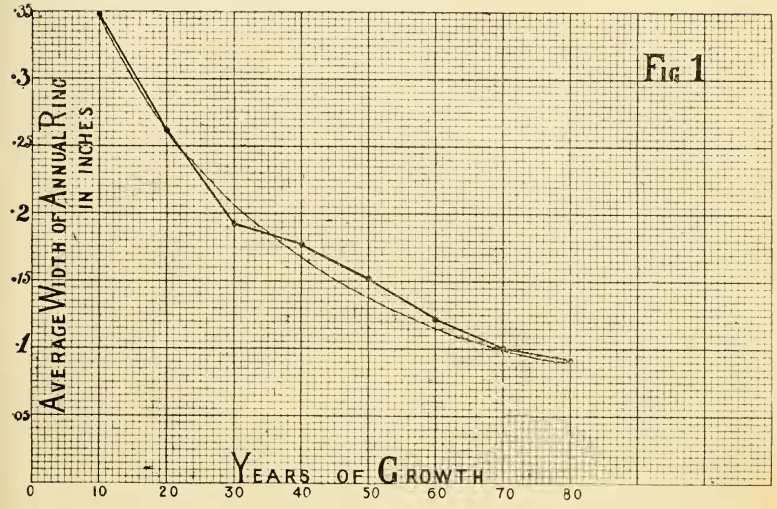
Fig 1
Average Width of Annual Ring in Inches
·35
·3
·25
·2
·15
·1
·05
Years of Growth
0
10
20
30
40
50
60
70
80

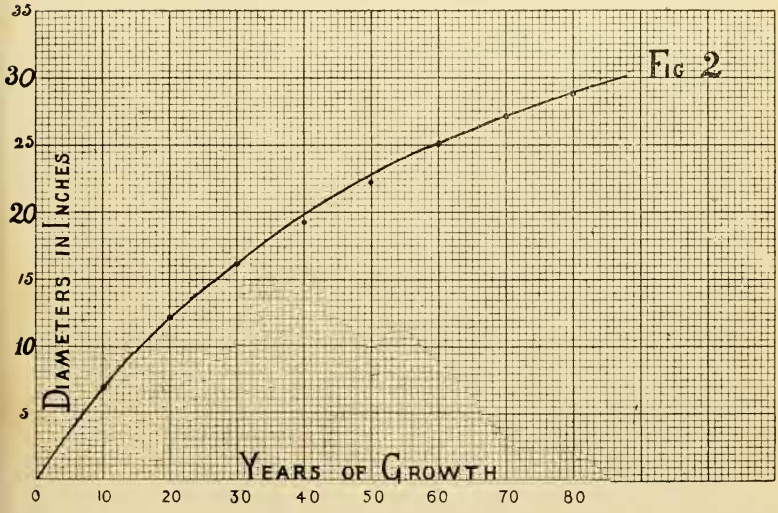
Fig 2
Diameters in Inches
35
30
25
20
15
10
5
Years of Growth
0
10
20
30
40
50
60
70
80